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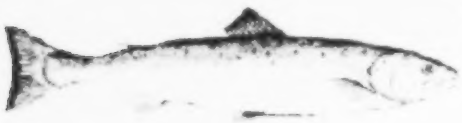
Newfoundland Region

DFO Science
Stock Status Report D2-01



ATLANTIC SALMON

NEWFOUNDLAND AND LABRADOR, SALMON FISHING AREAS 1-14B

Background

There are 15 Atlantic salmon (Salmo salar L.) management areas known as Salmon Fishing Areas (SFAs 1-14B) in Newfoundland and Labrador (Fig. 1). There are more than 200 rivers in Newfoundland and Labrador with anadromous Atlantic salmon populations. Each river is assumed to consist of at least one stock with larger rivers containing several stocks. Atlantic salmon exhibit a diverse life history structure including variations in freshwater residence time, age at maturity and duration and extent of ocean migrations. Spawning populations consist of varying proportions of small salmon (fork length less than 63 cm) and large salmon (fork length greater than or equal to 63 cm). The majority of rivers in Newfoundland primarily contain populations of small salmon or grilse which are maiden fish (never spawned before) that have spent one year at sea (1-sea-winter salmon) before returning to spawn. In Labrador, Bay St. George, and Humber rivers there is a significant large salmon component which contains a mixture of maiden fish that have spent two and occasionally three winters at sea (2- or 3-sea-winter salmon) before spawning and repeat spawners which had spawned previously one or more times. The majority of the maiden large salmon spawners are female. In other Newfoundland and Labrador rivers, the large salmon component mainly consists of repeat spawners, only a few of which are maiden fish. The relative proportions of the size groups in returns among rivers vary geographically.

Conservation for Atlantic salmon is considered to be a threshold reference point. The consequences of egg depositions below conservation to the long-term sustainability of the stock are unknown but the likelihood of deleterious effects are greater when egg depositions are below conservation. The conservation requirements are established for individual rivers based on 2.4 eggs per m^2 of riverine rearing habitat and 368 or 105 eggs per hectare of lake habitat depending on the river system. The status of stocks is assessed on the basis of the proportion of the conservation egg deposition achieved in a given year and the trends in abundance of various life stages.

Figure 1. Map of Newfoundland and Labrador showing the locations of Salmon Fishing Areas 1-14B.

The Fisheries

Atlantic salmon in Newfoundland and Labrador are potentially harvested by three user groups: Aboriginal communities, recreational fishers (including commercial outfitters), and commercial net fishers.

Recreational fisheries management in 1996 consisted of five strategies depending on stock levels in individual rivers: 1) retention fisheries for small salmon in insular Newfoundland with mandatory hook-and-release for large salmon,

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2) quotas for small salmon on some rivers in Newfoundland, 3) retention fisheries for small and large salmon in Labrador, 4) hook-and-release fisheries for both small and large salmon, and 5) shortened seasons or complete closures. Pre-season and in-season reviews of stock levels are done for 19 rivers in insular Newfoundland. In total, 72 rivers throughout insular Newfoundland were closed to angling in 1996, mainly due to high water temperatures and low water levels. Some of the rivers in Bay St. George were closed to angling, and others were open to hook-and-release only in 1996 due to low stock levels. Several rivers had individual quotas.

There were no recreational catch statistics collected for some rivers in SFAs 12, 13, and 14B in 1996. In 1996, there were 51,333 small and 1,871 large salmon (both retained and released) caught in SFAs 3-14A. Angling catches of small salmon in insular Newfoundland, in 1996, generally increased over those of previous years (Fig. 2). The recreational catch of small salmon (retained and released) in 1996 was 41% higher than the average of 1992-95, and 50% higher than the average of 1984-89. The proportion of hooked-and-released salmon has increased every year since 1994 while the highest occurred in 1993.

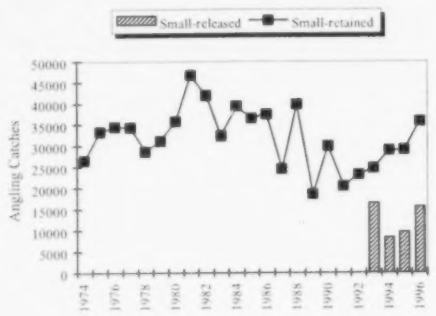

Figure 2. Recreational catches of small salmon in SFAs 3 -14A, 1974-96.

Information on the Labrador recreational fishery is found in the Labrador Stock Status Report. In general, Labrador recreational catches increased in SFA 2 and declined in SFA 1. In total, in Newfoundland and Labrador there were 56,254 small salmon and 2,489 large salmon caught (retained and released).

Commercial salmon fisheries are currently allowed only in Labrador, where fishing continued in 1996 with a quota of 55 tonnes. In 1996, the commercial fishery in Labrador opened on June 20 which was a change from 1995 when the opening date was July 3. The closure date of October 15 remained for those areas where the quotas were not caught. The number of licensed commercial fishers in 1996 was 218. Quotas were reached very quickly in SFA 2 but were not reached in SFAs 1 and 14B. In total, commercial landings were 48 t, the lowest in the period of 1974-96 (Fig 3). Commercial harvests in SFA 2 were lower due to the quotas; however, fishers in SFA 2 reported very high abundance while those in SFAs 1 and 14B reported very low to moderate abundance.

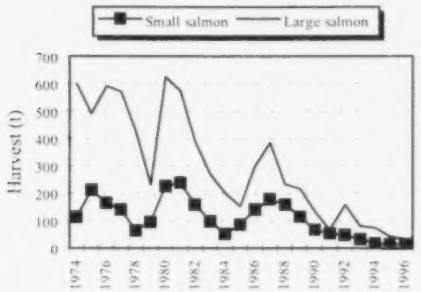

Figure 3. Commercial landings of small and large salmon in Labrador, SFAs 1, 2, and 14B, 1974-96.

Other management measures in 1996 which affected salmon stocks in the Newfoundland Region included the fifth year of the commercial salmon fishery moratorium for insular Newfoundland. In addition, the Greenland fishery operated in the summer of 1995 and intercepted salmon destined to return to Newfoundland and Labrador as large salmon in 1996. This is particularly important in Bay St. George and Labrador where many stocks have a multi-sea-winter life history component.

Environmental Considerations

Above normal air temperatures during the winter resulted in light ice conditions on the Newfoundland shelf during winter and spring of 1996. Ice retreated earlier than normal in southern Labrador, but heavy ice continued into August along the northern Labrador coast. In general, cold trends established in the late 1980s have moderated. The upward trend in temperature in recent years may represent the return to more temperate marine conditions which are favourable to salmon production. These warmer conditions in 1996 resulted in adults entering rivers up to two weeks earlier than had been the case in the last few years. Water levels in rivers were low in June and August but relatively high in July. These conditions promoted the distribution and availability of fish to anglers early in the year.

Survival

Egg to smolt survivals for Conne and Rocky rivers have shown increasing trends in recent years. Record juvenile abundance has been observed in the headwaters of Northwest Gander River. Campbellton and Conne rivers showed increased smolt runs in 1996. Exploits, Gander, Humber, and Torrent rivers and Middle and Western Arm brooks, showed trends towards an increased number of salmon produced per spawner which is indicative of increased survival.

Marine production depends, to a large degree on the number of smolts entering the sea, which varies annually, and the survival of these smolts to maturity. Sea survival back to the river also varies annually as a result of variable natural and fisheries mortality. Counts of smolts and adult salmon returns enable estimates of marine survival to be derived while examination of the trend in sea survival provides insight into the impact of changes in management measures or other factors such as climate. There are six rivers in Newfoundland where sea survival is regularly measured. Sea survival in five out of six increased in 1995 (smolt went to sea in 1995 and returned as grilse in 1996); for clarity, only survival rates for four stocks are shown in Fig. 4.

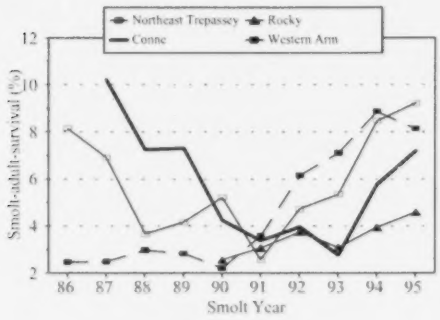

Figure 4. Sea survival rates at Northeast, Rocky, and Conne rivers and Western Arm Brook.

When survival rates for smolts from these rivers are considered together, they indicate an improvement in natural survival in recent years. A continued increase in natural survival rates will result in increased returns in 1997.

Resource Status

General abundance of adult salmon

During the commercial fishery moratorium (1992-96), the total numbers of small salmon returning to rivers in insular Newfoundland are considered to be the total number of salmon produced. The total abundance of adult salmon, in spite of increased returns to freshwater, remains low relative to the 1970s when salmon which were caught in commercial fisheries are added to the returns to rivers. Increased returns to freshwater on the west and northeast coasts are due both to the elimination of commercial salmon fishing mortality and reductions of by-catch in groundfish gear, as well as increased natural survival at sea. Abundance of salmon in some south coast rivers was lower in 1996 then prior to the moratorium. Abundance of small and large salmon remains low in the Bay St. George area of SFA 13. In Labrador, large salmon production which had declined from high levels in the early 1970s to record low levels in 1990-91 has increased somewhat since 1992. In Labrador, small salmon production did not show any declines until 1989, although recently abundance has increased.

Conservation Requirements

Of the 21 rivers assessed for egg depositions, 11 (52%) achieved 100% or greater of their conservation requirements in 1996. Six of the 10 rivers that had not achieved 100% of conservation requirements, were in Bay St. George. In Labrador, the overall number of large salmon spawners was 71% and 56% of the conservation requirements in 1995 and 1996, respectively. As a result of management measures, the number of spawners has increased steadily in Labrador since 1992, such that the estimated spawners in 1995 and 1996 are record highs.

Outlook

Short term

Sea survival appears to have improved for both Labrador and Newfoundland salmon stocks, and if it continues to do so over the next couple of years, returns will also improve. Specifically, for Labrador, the salmon returning to rivers over the next couple of years originate from spawners that had the lowest recorded abundance; however, the projected returns may increase over those expected due to the improvement in marine conditions effecting sea survival. It is projected that in 1997, the northwest and northeast coasts of insular Newfoundland will see an increase in abundance of small salmon due to the increase in egg deposition in 1992, the first year of the commercial fishery moratorium. Since the progeny of the 1992 spawners will not be fully recruited in 1997, a further increase in salmon abundance is expected in

1998. The south and southwest coasts (excluding Humber River) may benefit from increased sea survival as noted for other stocks. However, since spawners have remained low or decreased in many rivers since 1992, no great increases are expected in 1997 and 1998.

Long term

The long-term outlook for Atlantic salmon for insular Newfoundland is discussed in the impacts of the commercial fishery moratorium below. For Labrador salmon, increased numbers of large salmon are not expected until the year 2000 assuming that sea survival remains at current levels.

Impacts of the 1992-96 Moratorium

The decline in abundance of small salmon in insular Newfoundland, for 1989-91, resulted in a moratorium on commercial salmon fishing beginning in 1992. The goal of the moratorium was to increase the number of salmon spawning in freshwater which would lead to higher production in future years. The impact of the moratorium on numbers of small and large salmon in freshwater can be evaluated by comparing the numbers that returned to various rivers prior to and during the moratorium. The text table below shows the percent change in small and large salmon numbers at fish counting facilities for the pre-moratorium (1984-91) compared to moratorium periods (1992-96). A '+' sign indicates higher returns during the moratorium compared to pre-moratorium years; while a '-' sign indicates lower returns during the moratorium period.

	Small salmon	Large salmon
Northeast Coast	+67%	+276%
South Coast	-20%	-11%
Northwest Coast	+112%	+481%

Salmon stocks on the northwest and northeast coasts have increased substantially during the moratorium. This was not the case for south coast rivers, where overall salmon abundance declined during the moratorium. Thus, an increase in the number of adult salmon produced as a direct result of increased spawning escapements during the moratorium years can be expected in future along the northwest and northeast coasts but not on the south coast.

Management Considerations

A precautionary management approach is advisable for Atlantic salmon stocks of Newfoundland and Labrador, in particular in Labrador and Bay St. George. The precautionary approach considers the relative uncertainty of the projections and the effectiveness of fisheries management measures in ensuring spawner escapements exceed the conservation requirements. Under very uncertain conditions, the level of exploitation should be decreased thereby reducing the risk of not achieving the conservation requirements. There is a great deal of uncertainty in the Labrador salmon stock status due to the lack of sufficient river specific indicators of stock size (normally obtained from monitoring facilities). Alternately, under very certain conditions, where stocks have shown improvements, e.g. northwest and northeast coasts, the level of exploitation could be increased.

For Labrador salmon stocks, exploitation in commercial and angling fisheries should be

kept at low levels due to concern for large salmon spawners. The current high number of spawners in SFA 2 should allow stocks to rebuild. In SFA 14B, salmon populations appear to be at very low levels and further reductions in fishing mortality are warranted. In SFA 1, where information is sparse the current low participation in recreational and commercial fisheries is unlikely to have a serious negative effect on stock recovery.

In insular Newfoundland, stock problems still remain in the south coast and Bay St. George rivers, where the numbers of salmon returns have not substantially increased and in some cases have continued to decrease since the moratorium. Restrictive management measures should continue on these stocks. In rivers of the northwest and northeast coasts the opposite is true, and numbers of salmon have increased substantially since the moratorium. However, the first life cycle of salmon from increased spawners in 1992 will not be complete until 1998. Thus, restrictive measures should continue next year.

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This report is available:

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